

R E M A R K S

The reference to prior applications at the top of p. 1 of the specification has been amended to include applicants' latest continuation-in-part application (hereinafter "the parent case"), of which the present application is a continuation, thereby to satisfy the requirements of 37 C.F.R. §1.78.

In the parent case, claims 2, 10, 14, 16 - 19, 21, 23, 25 - 31 and 35 - 45 have either been allowed or indicated to be allowable if properly rewritten in independent form to include all limitations of the base claim and any intervening claim, as has now been done by amendment in that application. All other claims were rejected and have been canceled from the parent case. Those claims are now presented in this continuation application, from which the aforementioned allowed/allowable claims are canceled by this Preliminary Amendment. In addition, claim 1 has been amended to clarify its recital of certain novel and distinguishing features of the invention; and two new claims have been added, to provide specific coverage for a further aspect of the invention.

Claims 1 (independent; amended), 3 - 9, 11 - 13, 15, 20, 22, 24, and 32 - 34 (all directly or indirectly dependent on 1), 46 (new; dependent on 1) and 47 (independent; new) are in the application. All these claims are directed to methods of forming a metal container of defined shape and lateral dimensions. The corresponding claims in the parent application (i.e., other than new claims 46 and 47, and prior to the amendment herein made to claim 1) were rejected under 35 U.S.C. §102(b) as anticipated by U.S. patent No. 3,681,960 (Tadokoro), or under 35 U.S.C. §103(a) as unpatentable over Tadokoro alone or in view of U.S. patent No. 5,992,197 (Freeman et al.), the latter patent being relied on only for heating features recited in certain dependent claims.

With reference to the rejection of claim 1 as anticipated by Tadokoro, it may initially be noted that Tadokoro discloses a hydroforming process, conducted under very high pressures, that requires the simultaneous movement of two pressing pistons (col. 4, lines 26-28) respectively acting against opposed open and closed ends of a tubular blank while oil is injected into the tubular blank through the piston that bears against the open end thereof. The purpose in first sealing the tube at one end appears to be so that the piston pressing against that end can gain the necessary purchase to apply enough force to push additional metal into the bulge, thereby shortening the length of the blank. In this way, a relatively constant, overall wall thickness is maintained without any significant thinning in the bulge area. This was the improvement over the state of the hydroforming art contributed by Tadokoro.

Applicants' invention, on the other hand, is a modified blow-molding process in which a preform is immovably held by its open end and its closed end optionally contacts the one movable ram prior to pressurization. No part of the sides are in contact with the die walls at this stage. The pressures needed to expand the preform are much less than those used in hydroforming the heavy valve bodies in Tadokoro, as evidenced by the fact that a gas, as opposed to a less compressible liquid, is the preferred expansion fluid for applicants' method. Furthermore, only the bottom ram moves during pressurization; i.e., mechanical force is applied solely in one direction. As well as forming the bottom shape of the container, the ram prevents the bottom from "blowing out" during expansion (specification, p. 14, lines 20-29). So the primary reason for the ram to be movable is to prevent blow out, not (as is the case in Tadokoro) to prevent thinning of the sidewalls. In fact, in applicants' method, the side walls have been found to thin on the order of 60-70%.

In order to clarify the distinction over Tadokoro, claim 1 has been amended to recite that the method employs only a single movable punch, which is located at one end of the cavity. This amendment is supported by the disclosure of all embodiments of the invention described and shown in the original specification and drawings. The claim as thus amended is not anticipated by Tadokoro, which requires two opposed pressing pistons. Moreover, since the advantages achieved by Tadokoro are dependent on the action of two "pressing pistons" simultaneously exerting pressure on opposite ends of a tubular blank, no method employing a single movable punch (to which amended claim 1 is now limited) could be obvious from Tadokoro. It follows that claim 1 as herein amended, and all claims dependent thereon, distinguish patentably over Tadokoro.

What is lacking in Tadokoro is not supplied by Freeman et al., combined with Tadokoro in the rejection of claims 22, 24 and 32 - 34 under 103(a). Freeman et al. discloses a hydroforming process whereby local areas of a tube are heated to cause preferential deformation in only those areas. Each portion of the tube wall in a selected area would be expected to deform essentially simultaneously. Freeman et al. is concerned with "pushing" metal into the expanding areas to increase the wall thickness at these locations, contrary to what occurs in applicants' method. Furthermore, it is difficult to see how a person skilled in the art could apply the teaching of Freeman et al. to create the temperature gradients recited in claims 22 and 32, i.e., gradients that cause the deformation to move progressively along the entire preform in a direction dictated by the positioning of those gradients.

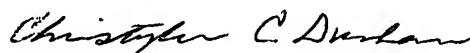
New independent claim 47 corresponds to original claim 1 except that it recites that the "fluid pressure" (of claim 1) is gas pressure. This recital is supported by the original disclo-

sure of the specification, e.g. at (p. 18, lines 13-15). Since gas pressure is not taught by Tadokoro and could not be used in the Tadokoro process, the recital of gas pressure in combination with the other features of claim 47 is submitted to present a patentable distinction over Tadokoro.

New claim 46, dependent on 1, also recites that the fluid pressure is provided by a gas, thereby providing specific coverage for the combination of "single movable punch" and "gas pressure" limitations.

For the foregoing reasons, it is believed that this application is now in condition for allowance. Favorable action thereon is accordingly courteously requested.

Respectfully,


Christopher C. Dunham
Reg. No. 22,031
Attorney for Applicants
Tel. (212) 278-0400